

US EPA RECORDS CENTER REGION 5



508912

**SECOND FIVE-YEAR REVIEW REPORT FOR  
THE OTTAWA RADIATION AREAS SUPERFUND SITE  
LASALLE COUNTY, ILLINOIS**



**Prepared by**

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## LIST OF ABBREVIATIONS & ACRONYMS

AOC	Administrative Order on Consent
bgs	Below Ground Surface
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
EPA	United States Environmental Protection Agency
ESD	Explanation of Significant Differences
ICs	Institutional Controls
IL EPA	Illinois Environmental Protection Agency
IEMA	Illinois Emergency Management Agency
Illinois UECA	Illinois Uniform Environmental Covenants Act, 765 ILCS Ch. 122
LPI	Luminous Processes, Inc.
NCP	National Contingency Plan
NPL	National Priorities List
O&M	Operation and Maintenance
pCi/g	Pico Curies per Gram
pCi/L	Pico Curies per Liter
RAO	Remedial Action Objectives
ROD	Record of Decision
ROW	Right-of-Way
RPM	Remedial Project Manager

## **I. INTRODUCTION**

The purpose of a Five-Year Review (FYR) is to evaluate the implementation and performance of a remedy in order to determine if the remedy is and will continue to be protective of human health and the environment. The methods, findings, and conclusions of reviews are documented in FYR reports such as this one. In addition, FYR reports identify issues found during the review, if any, and document recommendations to address them.

The United States Environmental Protection Agency (EPA) is preparing this FYR pursuant to the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), Section 121, consistent with the National Contingency Plan (NCP) (40 C.F.R. Section 300.430(f)(4)(ii)), and considering EPA policy.

This is the second FYR for the Ottawa Radiation Areas Superfund Site (Site). The triggering action for this statutory review is the signature date of the previous FYR on November 7, 2011. The FYR has been prepared due to the fact that hazardous substances, pollutants, or contaminants remain at the Site above levels that allow for unlimited use and unrestricted exposure (UU/UE). The Site consists of five Operable Units (OUs), three of which are addressed in this FYR.

The Ottawa Radiation Areas Superfund Site FYR was led by Nabil Fayoumi, EPA Remedial Project Manager. Participants included Cheryl Allen, EPA Community Involvement Coordinator, Robin Ambrose, Illinois Environmental Protection Agency (IL EPA) Project Manager, and Adnan Khayyat, Illinois Emergency Management Agency (IEMA) Project Manager. IL EPA and IEMA were notified of the initiation of the five-year review. The review began on 6/22/2016.

### **Site Background**

EPA and the State of Illinois discovered 16 subareas (identified as NPL-1 through 14, Illinois Power Building, and Luminous Processes, Inc. Adjacent) in and around the City of Ottawa with radioactive contamination and subsequently targeted them for cleanup. On July 29, 1991, EPA added the Ottawa Radiation Areas Site to the National Priorities List (NPL).

The Ottawa Radiation Areas Site became contaminated as a result of activities associated with two radium dial painting companies: the Radium Dial Company, which operated in the City of Ottawa from 1920 through 1932 and the Luminous Processes, Inc. (LPI), which operated in the City of Ottawa from 1932 to 1978. The source of contamination was radium sulfate paint that Radium Dial and LPI used in their dial painting operations. During the course of operations, the companies' equipment, material, buildings, and surrounding work areas became contaminated with radium-226, the major isotope of radium sulfate. Waste from these companies was likely disposed of at one of the subareas, NPL-8, and may have been used as fill material within the community. Debris from the demolition of the Radium Dial facility, which occurred in 1968, was likely also buried at one or more locations in the area. The IEMA (formerly known as the Illinois Department of Nuclear Safety) demolished the LPI building in 1985, and contaminated debris from this demolition was disposed of at a licensed radioactive disposal facility.

Of the 16 subareas, EPA prioritized residential properties and properties near residential areas for removal actions because they posed a greater endangerment to the public. Between 1995 and 1997, EPA conducted removal activities at 12 of the 16 subareas; EPA is not conducting a review of the 12 removal

subareas because radium-contaminated soil was removed to a cleanup level of 6.2 pico curies per gram (pCi/g) radium-226, which allows UU/UE at these removal properties.

The Ottawa Radiation Areas Site consists of five OUs:

- OU1 (NPL-8 landfill)
- OU2 (NPL-1, 4, 9, 11, and Illinois Power Building)
- OU3 (Lead-Contaminated Soil Removal)
- OU4 (NPL-8 Frontage Property)
- OU5 (LPI Adjacent)

Three OUs are addressed in this FYR:

- OU2 (NPL-1, 4, 9, 11, and Illinois Power Building)
- OU3 (Lead-Contaminated Soil Removal)
- OU5 (LPI Adjacent)

Remedial action has not yet been initiated as OUs 1 and 4. Therefore remedy protectiveness of OUs 1 and 4 is not evaluated in this FYR.

### FIVE-YEAR REVIEW SUMMARY FORM

SITE IDENTIFICATION		
Site Name: Ottawa Radiation Areas Site		
EPA ID: MID 980606750		
Region: 5	State: IL	City/County: LaSalle County
SITE STATUS		
NPL Status: Final		
Multiple OUs? Yes	Has the Site achieved construction completion? No	
REVIEW STATUS		
Lead agency: EPA		
Author name (Federal or State Project Manager): Nabil Fayoumi, EPA Remedial Project Manager		
Author affiliation: EPA		
Review period: 6/7/2016 – 10/01/2016		
Date of Site inspection: 9/27/2016		
Type of review: Statutory		
Review number: 2		
Triggering action date: 11/7/2011		
Due date (five years after triggering action date): 11/7/2016		

## II. RESPONSE ACTION SUMMARY

### Basis for Taking Action

Hazardous substances that have been released in soil at the following subareas of the Site include:

NPL-1, 4, 9, 11, Illinois Power Building (OU2), and LPI Adjacent (OU5):

#### Soil

Radium-226 (includes radon-222 decay by-products)

NPL-8:

#### Soil

Radium-226 (includes radon-222 decay by-products)

Benzo(a)anthracene

Benzo(a)fluoranthene

Benzo(a)pyrene

Indeno(1,2,3-cd)pyrene

Dibenzo(a,h)anthracene

Antimony

Arsenic

Beryllium

Iron

Lead

Manganese

Exposures to soil are associated with significant human health risks, due to exceedance of EPA's risk management criteria for either the average or the reasonable maximum exposure scenarios. The carcinogenic risks are exceeded for exposure to radium-226 at the subareas in soil. At the NPL-8 landfill property, the carcinogenic risks and non-carcinogenic risks were exceeded for exposure to polycyclic aromatic hydrocarbons and metals in soil. For these NPL subareas, exposures to radon gas via inhalation also constituted an unacceptable risk. Since EPA found that groundwater was not significantly impacted at any of the subareas, there are no specific remedial components for groundwater contamination. However, contaminated perched water was discovered at some of the subareas and as part of excavation activities perched water may be encountered, particularly for the complete excavations alternatives proposed for NPL-4 and NPL-8. The ecological risk assessment did not find adverse effects to environmental receptors, terrestrial plants, or aquatic invertebrates. However, additional non-radiation data was collected at NPL-1 and NPL-9, resulting in a lead-contaminated soil removal.

### Response Actions

Of the 16 subareas, EPA prioritized residential properties and properties near residential areas for removal actions because they posed a greater endangerment to the public. Between 1995 and 1997, EPA conducted removal activities on 12 of the 16 subareas. Removals were conducted at NPL-1, 2, 3, 5, 6, 7, 9, 10, 11, 12, 13, and 14. The removal cleanup level for radium-226 was established as 5 pCi/g, which is above the background level of 1.2 pCi/g for the Ottawa area. The final cleanup level for removal actions was determined to be 6.2 pCi/g in soil. Approximately 32,000 cubic yards of radioactive soils and debris

were removed. However, EPA did not complete removals at NPL-1, 9, and 11 because of the following reasons: (a) the pervasiveness of the land filled wastes; (b) the total cost, approximately \$35 million; and (c) the amount of time needed to complete the removal actions far exceeded the limits of the Superfund Removal Program. At NPL-1, a total of 12,040 tons or approximately 9,000 cubic yards of radium-contaminated soil was removed. At NPL-9, a total of 5,766 tons or approximately 4,300 cubic yards of radium-contaminated soil was removed. At NPL-11, a total of 4,176 tons of radium-contaminated soil was removed. EPA further investigated the areas where cleanup activities were not completed (NPL-1, 9, and 11), as well as other areas (NPL-4, NPL-8, Illinois Power Building, and LPI Adjacent) under the Superfund Remedial Program.

In 2002, EPA removed lead-contaminated soil from scattered locations at the NPL-1 and NPL-9 areas. At NPL-1, a total of 400 cubic yards of soil were removed from four residential locations. In the industrial area of NPL-9, approximately 5,000 cubic yards of lead-contaminated soil were removed. Six residential properties in the area of NPL-4 were connected to the City of Ottawa's municipal water supply due to beryllium in the residential wells.

The Ottawa Radiation Areas are divided up into the following OUs:

- OU1 (NPL-8 landfill)
- OU2 (NPL-1, 4, 9, 11, and Illinois Power Building)
- OU3 (Lead-Contaminated Soil Removal)
- OU4 (NPL-8 Frontage Property)
- OU5 (LPI Adjacent)

The following decision documents have been issued for the Site:

- NPL-1, 4, 9, and Illinois Power Building: Record of Decision (ROD) dated September 8, 2000
- NPL-1: the 2000 ROD was amended by ROD Amendment dated September 6, 2013
- NPL-8 landfill: ROD dated September 8, 2000
- NPL-8 Frontage Property and NPL-11: ROD dated September 24, 2003
- NPL-11: the 2003 ROD was amended by ROD Amendment dated August 16, 2010
- Illinois Power Building: Explanation of Significant Differences (ESD) dated August 2, 2012 modified the 2000 ROD
- LPI Adjacent: ESD dated March 21, 2007 modified the 2003 ROD

The following remedial action objectives (RAOs) have been identified for the Site:

- Prevent ingestion and inhalation of external exposure to surface and subsurface soil contaminated with radium-226 exceeding a cleanup level of 6.2 pCi/g.
- Prevent lateral migration of radium-226 in groundwater and prevent exposure of wildlife to contaminated soil.
- Prevent downward migration of contaminants of concern in soil to perched groundwater and groundwater via percolation.

The major components of the selected remedies are summarized below.



## **OU1 (NPL-8 landfill)**

- Excavate soil contaminated with radium-226, above 6.2 pCi/g, down to a depth of 10 ft bgs;
- Backfill excavated areas with clean material;
- Process excavated soil to: (a) separate out the contaminated portion; and (b) reduce, to the extent practical, the volume of contaminated soil disposed off-site. This may be done using a segmented gate system, if that system is determined to be effective through pilot testing. If the pilot testing demonstrates that the segmented gate is not effective or will not result in cost savings, then the material may be manually separated instead to achieve volume reduction;
- Dispose of the excavated contaminated material at an off-site, licensed radioactive material landfill;
- Potential erosion measures for Fox River banks; and
- ICs that restrict siting of buildings and excavation below 10 feet in soil.

The selected remedy for NPL-8 will not support UU/UE.

## **OU2 (NPL-1, 4, 9, 11, and Illinois Power Building)**

### **NPL-1**

- Excavate soil contaminated with radium-226 above 6.2 pCi/g and, if necessary, soils contaminated with organic and/or inorganic chemicals;
- Backfill excavated areas with clean material;
- Dispose of the excavated contaminated material at a licensed radioactive material or off-site landfill in accordance with applicable federal and/or state regulations; and
- Collect perched water during excavation with treatment, if necessary, and discharge to the City of Ottawa's wastewater treatment system.

During the 2006 and 2007 remedial action excavations at NPL-1A, an area of radium-226 contamination, NPL-1 Area E (NPL-1E), was identified along the east portion of Guion Street extending beneath the sewer pipe. The contamination located at NPL-1E was not identified in previous removal and remedial actions. During the 2009 and 2011 supplemental remedial investigations (RI), additional radium-226 contaminated soil at a depth of 6 to 16 feet (ft) was identified in NPL-1A.

EPA signed a ROD Amendment on September 6, 2013 to modify the 2000 ROD remedy to include Area NPL-1E and to select in-place containment, and institutional controls (ICs) as the amended remedy to address remaining contaminated soil at depth in Areas NPL-1A and NPL-1E. The amended remedy was adopted in response to new information that was collected since the 2000 ROD was issued, which showed that additional excavation of the waste buried at a depth of 6 to 16 ft will be difficult to implement, the remedial action cost would be unreasonably high relative to the long-term benefits, and the residual radium contaminated waste does not pose a clear present or future hazard to human health and the environment. Under the amended remedy, ICs, such as an environmental covenant under the Illinois Uniform Environmental Covenants Act, 765 ILCS Ch. 122 (UECA), would impose the following perpetual activity and use limitations on the NPL-1 site:

- Prohibit excavation of soil and/or material below approximately 4 ft below ground surface (bgs) at Area NPL-1A, and 2 feet at Area NPL-1E; unless the excavation is conducted pursuant to EPA-or IEMA-approved work plan.
- Prohibit construction and use of any building.

- Require that material excavated from any portion of the Site be tested and disposed of in accordance with applicable regulations.
- Maintain the clean soil cover in the area of IC, which is present to at least 4 ft bgs at NPL-1A.
- Maintain a hard surface or clean soil cover of at least 6.5 inches in thickness at Area-1E.
- Prohibit any indoor and residential use.
- Prohibit uses inconsistent with recreational land use at Area NPL-1A.
- Prohibit uses inconsistent with current land use as a public roadway or recreational land use at Area NPL-1E.

The selected remedy at NPL-1 will not allow UU/UE.

#### **NPL-4**

- Excavate soil contaminated with radium-226 above 6.2 pCi/g and, if necessary, soils contaminated with organic and/or inorganic chemicals;
- Backfill excavated areas with clean material;
- Process excavated soil to: (a) separate out the contaminated portion; and (b) reduce, to the extent practical, the volume of contaminated soil disposed off-site. This may be done using a segmented gate system, if that system is determined to be effective through pilot testing. If the pilot testing demonstrates that the segmented gate is not effective or will not result in cost savings, then the material may be manually separated instead to achieve volume reduction;
- Dispose of the excavated contaminated material at a licensed radioactive material or off-site landfill in accordance with applicable federal and/or state regulations; and
- Collect perched water during excavation with treatment, if necessary, and discharge to the City of Ottawa's wastewater treatment system.

EPA initiated and completed Phase 1 and 2 of NPL-4 RA in 2016. Phase 1 addressed soils exhibiting radioactivity levels of 100 pCi/g or greater. Phase 2 addressed soils exhibiting radioactivity levels of greater than 6.2 pCi/g and less than 100 pCi/g. A total of 38,377 tons of soil contaminated with radium-226 were excavated and disposed off-site at a licensed radioactive material landfill. Perched groundwater was treated and discharged to the City of Ottawa sewer. The selected remedy allows NPL-4 to support UU/UE.

#### **NPL-9**

- Excavate soil contaminated with radium-226 above 6.2 pCi/g and, if necessary, soils contaminated with organic and/or inorganic chemicals;
- Backfill excavated areas with clean material; and
- Dispose of the excavated contaminated material at a licensed radioactive material or off-site landfill in accordance with applicable federal and/or state regulations.

The selected remedy allows UU/UE at NPL-9.

## **NPL-11**

As part of the 1996 removal action, EPA excavated soil contaminated with radium-226 down to an elevation of 491.25 feet, disposed of the contaminated material at a licensed radioactive material landfill, and placed five to six feet of clean backfill over the remaining contamination at NPL-11. Although the 2003 ROD for NPL-11 selected excavation of all soil contaminated with radium-226 above 6.2 pCi/g, EPA's subsequent investigation determined that it was technically impracticable to meet the 6.2 pCi/g cleanup level below an elevation of 491.25 feet on two parcels of NPL-11. EPA subsequently signed a ROD Amendment on August 16, 2010, which selected environmental covenants to implement the following land use restrictions:

- Prohibit excavation of soil at the site below an elevation of 491.25 feet in the area demarcated as the extent of contamination, unless conducted pursuant to an EPA- or Illinois EMA-approved work plan;
- Prohibit construction of any building in the area demarcated as the extent of contamination, unless a radon reduction system is operating and maintained to ensure that levels of radon in such buildings do not exceed 0.02 working level. Further, only slab-type buildings would be allowed;
- Require that material excavated from any portion of the Site be tested and disposed of in accordance with applicable regulations; and
- Prohibit use of groundwater at the NPL-11 Site.

The selected remedy for NPL-11 will not support UU/UE.

## **Illinois Power Building**

EPA excavated and disposed of soil contaminated with radium-226 off-site at a licensed radioactive material landfill. A restrictive covenant has been implemented, which requires the owners to conduct radon monitoring in the Illinois Power Building, which lies adjacent to the excavated area, to determine if radon levels exceed permissible levels. If radon levels persist then a radon reduction system will be required to be operated in the building and additional testing may be needed.

On August 2, 2012, EPA signed an ESD for the Illinois Power Building. The ROD addressed by this ESD is the OU2 2000 ROD. The purpose of the ESD was to document the final decision to include the 2008 Environmental Restrictive Covenant as part of the remedy for the Site. The selected remedy for Illinois Power Building does not support UU/UE.

## **OU3 (Lead-Contaminated Soil Removal)**

In an Action Memorandum dated September 17, 2001, EPA selected a response action to remove contaminated soils above lead cleanup levels to a depth not to exceed 4 feet at 613 West Marquette Street and certain other properties. Although the property at 613 West Marquette Street is located within the NPL-9 subarea, soil screening indicated that this address was not contaminated with radium; however, soil contaminated with lead was found at this property and certain other properties located within NPL-9. After implementation of the removal action, sampling revealed some areas at 613 West Marquette Street exceed industrial/commercial cleanup standards below 4 feet. The former landowners recorded a restrictive covenant that limits the use of the property to industrial/commercial use, prohibits residential use and prohibits disturbance of soil below 4 feet. The 2000 ROD and the 2001 Action Memorandum do not require ICs for 613 West Marquette Street. An ESD requiring ICs for this parcel is needed. The removal action does not support UU/UE.

#### **OU4 (NPL-8 Frontage Property)**

- Excavate soil contaminated with radium-226, above 6.2 pCi/g, down to a depth of 10 ft bgs;
- Backfill excavated areas with clean material;
- Process excavated soil to: (a) separate out the contaminated portion; and (b) reduce, to the extent practical, the volume of contaminated soil disposed off-site. This may be done using a segmented gate system, if that system is determined to be effective through pilot testing. If the pilot testing demonstrates that the segmented gate is not effective or will not result in cost savings, then the material may be manually separated instead to achieve volume reduction;
- Dispose of the excavated contaminated material at an off-site, licensed radioactive material landfill;
- Potential erosion measures for Fox River banks; and
- ICs that restrict siting of buildings and excavation below 10 feet in soil.

The selected remedy for NPL-8 will not support UU/UE.

#### **OU5 (LPI Adjacent)**

- Excavate soil contaminated with radium-226 above 6.2 pCi/g;
- Backfill excavated areas with clean material;
- Dispose of the excavated contaminated material at a licensed radioactive material or off-site landfill in accordance with applicable federal and/or state regulations;
- Collect perched water (if necessary), treat and discharge to surface water or discharge to the City of Ottawa's wastewater treatment system; and
- Option of volume reduction - Process excavated soil to (a) separate out the contaminated portion; (b) reduce, to extent practical, the volume of contaminated soil to be disposed of off-site. This may be done using mechanical screening and/or segmented gate system if that system is determined to be effective for the volume of soil to be excavated.

The selected remedy allows UU/UE at the LPI Adjacent property.

### **Status of Implementation**

#### **OU1 (NPL-8 landfill)**

EPA has not yet implemented the remedy in the NPL-8 subarea. The timing for implementation of NPL-8 remedy is dependent on the availability of state funding for their 50% cost share.

#### **OU2 (NPL-1, 4, 9, 11, and Illinois Power Building)**

In 2006 through 2007, the EPA initiated the remedial action at NPL-1, 9, 11, and Illinois Power Building subareas. The radium-contaminated soil from NPL-1, 9, and Illinois Power Building subareas was disposed of at a licensed radioactive material facility in Clive, Utah.

#### **NPL-1**

EPA excavated 6,502 tons of radium-contaminated soil to a depth of 15.6 feet bgs at the NPL-1 subarea. All of the contamination was removed to meet the 6.2 pCi/g cleanup level except for one area in the northwest corner where the contamination extends under Guion Street. Perched groundwater was treated and discharged to the Fox River. Soil samples collected during the cleanup confirmed that contamination was underneath Guion Street. Radium contamination under Guion Street ranged from 0.24 to 176 pCi/g at a depth 9 to 10 feet with an estimated volume of 636 cubic yards. Pursuant to the Consent Decree (1:10-cv-01887) with the United States, the City of Ottawa has agreed to prohibit

interference with the asphalt road and excavation of soils under the road unless the action is taken pursuant to a work plan approved by EPA.

The NPL-1 excavation areas expanded beyond the EPA's estimation. Consequently, due to time and budgetary constraints, EPA did not complete the entire cleanup. A supplemental remedial investigation conducted at NPL-1 in 2009, found radium-226 contamination from a depth of 4 to 16 feet with concentrations ranging from 6.96 to 194 pCi/g, and estimated volume of 385 cubic yards. Contamination could be present under the Marquette High School Athletic Field locker room/storage building; however, radon testing results of the locker room/storage building were below the recommended action level of 4.0 pCi/L.

In the 2013 ROD Amendment, it was determined that additional excavation of the waste buried at a depth between 6 to 16 ft will be difficult to implement, the remedial action cost would be unreasonably high relative to the long-term benefits, and the residual radium contaminated waste does not pose a clear present or future hazard to human health and the environment. ICs are required by the 2013 ROD Amendment to address contaminated soil in two Areas, NPL-1A and NPL-1E. Area NPL-1A consists of two parcels (River Walk Access Right of Way owned by the Catholic School, and 325 E. Lafayette St., parcel 21-11-237-001). NPL-1E consists of Guion Street. The owner of 325 E. Lafayette St., parcel 21-11-237-001, has implemented an environmental covenant to implement the required land use restrictions. EPA is working with the City of Ottawa and the Catholic Diocese of Peoria on implementing the environmental covenants on the remaining two parcels at NPL-1 (River Walk Access Right of Way and Guion St.). Remedy implementation is complete at NPL-1, except for the remaining ICs. The implemented remedy does not allow UU/UE.

#### NPL-4

EPA initiated and completed Phase 1 and 2 of NPL-4 Remedial Action in 2016. Phase 1 addressed soils exhibiting radioactivity levels of 100 pCi/g or greater. Phase 2 addressed soils exhibiting radioactivity levels greater than 6.2 pCi/g and less than 100 pCi/g. A total of 38,377 tons of soil contaminated with radium-226 were excavated and disposed off-site at a licensed radioactive material landfill. Perched groundwater was treated and discharged to the City of Ottawa sewer. Remedy implementation is complete at NPL-4. The implemented remedy allows UU/UE.

Residual contamination remains adjacent to NPL-4, in the Right of Way (ROW) area of Canal Road, due to the presence of an 8-inch high pressure gas main. EPA will gather additional information to characterize this area and develop a remedial approach.

#### NPL-9

EPA excavated soil to a depth of 11 feet bgs at NPL-9A. A total of 640 tons of radium-contaminated waste was excavated from the NPL-9A subarea. At NPL-9B, soil excavated ranged in depth from 7 feet near the tow path to 4 feet near the railroad tracks. A total of 204 tons of radium-contaminated waste was excavated from the NPL-9B subarea. Confirmation samples confirmed that the 6.2 pCi/g cleanup level was met. Perched groundwater was treated and discharged to the City of Ottawa sewer. Remedy implementation is complete at NPL-9. The implemented remedy selected under the 2000 ROD at NPL-9 allows UU/UE. [Note that the 2001 removal action to remove lead-contaminated soils from certain properties within subarea NPL-9 did not achieve UU/UE for lead in soil. See OU3 (Lead-Contaminated Soil Removal).]

## NPL-11

EPA amended the 2003 ROD by a ROD Amendment for NPL-11, which was signed on August 16, 2010. As part of the 1996 removal action, EPA excavated soil contaminated with radium-226 down to an elevation of 491.25 feet and disposed of the contaminated material at a licensed radioactive material landfill. Five to six feet of clean backfill was placed over the remaining contamination.

The 2010 ROD Amendment was based on sampling data collected during the 2006 through 2007 remedial action at NPL-1, 9, 11, and Illinois Power Building subareas. In the 2010 ROD Amendment, it was determined that the complete excavation of the remaining radium-contaminated material was technically impracticable. The 2010 ROD Amendment selected environmental covenants to address the remaining radium-226 contamination below 491.25 feet. The owner of the 353 Bellevue Avenue parcel has signed and recorded an environmental covenant to implement the required land use restrictions.

The owners of the other NPL-11 area (351 Bellevue Avenue parcel) have signed an Administrative Order on Consent (AOC) (VW-91-C-081 dated December 31, 1990) whereby they agreed to prohibit residential and commercial construction on the parcel. EPA completed the investigation of groundwater to determine the extent of contamination in 2014 (see Data Review for a summary of the results of the investigation).

Remedy implementation is complete at NPL-11, except for the remaining ICs. The groundwater does not require remedial action as regulatory standards are not exceeded. The implemented remedy does not allow UU/UE.

## Illinois Power Building

At the Illinois Power Building, EPA excavated a total of 23 tons of radium-contaminated soil. EPA excavated soil in the western area to a depth of 18 inches and in the southern area (located between the former Illinois Power Building and Jefferson Street) to approximately a one-foot depth. Confirmation samples confirmed that the 6.2 pCi/g cleanup level was met. The soil beneath the building was never evaluated for safety reasons.

IEMA collected radon measurements in all occupied areas of the building to characterize radon levels. Data were recorded over one weekend, from August 10, 2007 to August 13, 2007, using activated charcoal detectors and continuous radon monitors. IEMA's Radon Measurement and Characterization Report indicated the average radon concentration for both the charcoal detectors and continuous radon monitors was below the recommended action level of 4.0 pCi/L. However, the continuous radon monitor results indicated periods where the radon concentration was above the action level. IEMA recommended that indoor radon mitigation systems be returned to full operability. The systems are currently operational and functional and keep the radon levels below 4.0 pCi/L.

Since the soil beneath the building was never evaluated, a Declaration of Environmental Restrictive Covenant was recorded by the LaSalle County Recorder on September 9, 2008. The restrictive covenant included the following restrictions:

No excavation under buildings: The extent of contamination, if any, associated with the soils underneath the foundations of the buildings has not been determined. No action shall be taken to drill or intrude into, or demolish the building foundations and no action shall be taken to excavate soils under the buildings unless the owner conducts an extent of contamination study

and removes all soils that exceed 6.2 pCi/g radium-226 pursuant to an IEMA approved work plan on the property.

**Radon Mitigation System:** The owner must operate and maintain a radon mitigation system in any buildings on the property to ensure that levels of radon do not exceed 4 pCi/L or other radon level that EPA determines is necessary to protect human health or the environment. The owner must conduct radon testing at the building at least every two years by an IEMA licensed measurement professional to ensure the mitigation system is working properly.

On August 2, 2012, EPA signed an ESD for the Illinois Power Building. The ROD addressed by this ESD is the OU2 2000 ROD. The purpose of the ESD was to document the final decision to include the 2008 Environmental Restrictive Covenant as part of the remedy for the Site. Remedy implementation is complete at the Illinois Power Building. The implemented remedy does not allow UU/UE.

### **OU3 (Lead-Contaminated Soil Removal)**

A removal action was conducted pursuant to an Action Memorandum dated September 17, 2001 whereby lead-contaminated soils above lead cleanup levels to a depth not to exceed 4 feet was implemented at 613 West Marquette Street and certain other properties. Although the property at 613 West Marquette Street is located within the NPL-9 subarea, soil screening indicated that this address was not contaminated with radium; however, soil contaminated with lead was found at this property and certain other properties located within NPL-9. After implementation of the removal action, sampling revealed some areas at 613 West Marquette Street exceed industrial/commercial cleanup standards below 4 feet. The former landowners recorded a restrictive covenant that limits the use of the property to industrial/commercial use, prohibits residential use and prohibits disturbance of soil below 4 feet. Implementation of the removal action is complete at NPL-9. The 2000 ROD and the 2001 Action Memorandum do not require ICs for 613 West Marquette Street. An ESD requiring ICs for this parcel is needed. The implemented removal action does not allow UU/UE due to remaining levels of lead in soil.

### **OU4 (NPL-8 Frontage Property)**

EPA has not yet implemented the remedy in the NPL-8 subarea. The timing for implementation of NPL-8 remedy is dependent on the availability of state funding for their 50% cost share.

### **OU5 (LPI Adjacent)**

The remedy was implemented in 2009. A total of 411 tons of radium-contaminated material was excavated to the lowest depth of 5 feet. Confirmation samples confirmed that the 6.2 pCi/g cleanup level was met. No perched groundwater was encountered. The material was shipped to a licensed facility in Grand View, Idaho. The remedy allows UU/UE at the LPI Adjacent property.

## Institutional Controls

Table 1: Summary of Planned and/or Implemented Institutional Controls

Media, engineered controls, and areas that do not support UU/UE based on current conditions	ICs Needed	ICs Called for in the Decision Documents	Impacted Parcel(s)	IC Objective(s)	Title of IC Instrument(s) Implemented and Date (or planned)
NPL-1A and NPL-1E Radium-226 remains at NPL-1A and 9-10 feet bgs under road at Guion Street (NPL-1E).	Yes	Yes	River Walk Access Right of Way 325 E. Lafayette St (21-11-237-001) Guion St	Prohibit interference with asphalt road or excavation of soils under road unless action is taken pursuant to a work plan approved by EPA	Consent Decree: 1:10-cv-01887 between City of Ottawa and United States - implemented May 17, 2010.  Environmental Covenant 2014-04918 for parcel 21-11-237-001 recorded with LaSalle Recorder on March 20, 2014  Two Environmental Covenants for River Walk Access and Guion St are planned.
NPL-4, in the ROW area of Canal Road	TBD	TBD	TBD	TBD	TBD
NPL-8 Landfill and Frontage Property: The remedy has not yet been initiated. After remedy construction is completed, radium-226 will remain below 10 feet bgs.	Yes	Yes	TBD	Prohibit disturbance of the soil cover, construction of buildings with basements, and radon reduction system for any	Environmental Covenant planned following completion of construction.



				building with basements.	
NPL-9: Soil contaminated with lead remains below 4 feet bgs at 613 W. Marquette.	Yes	No	613 W. Marquette parcel	Prohibit residential use and disturbance of soil below 4 feet.	Warranty Deed with Reservation of Environmental Easement and Declaration of Restrictive Covenants recorded with the LaSalle County Recorder (document no. R2004-6385) March 16, 2004.
NPL-11: Radium-226 contaminated soil remains below an elevation of 491.25 feet in certain areas of 351 and 353 Bellevue Avenue (see Figure 9).	Yes	Yes	351 Bellevue Avenue parcel  353 Bellevue Avenue parcel	Prohibit excavation of soil at the Site below an elevation of 491.25 feet in certain areas unless conducted pursuant to an EPA- or IEMA-approved work plan.  Test and dispose of material excavated from any portion of the Site in accordance with applicable regulations.  Prohibit construction of any building, unless a radon reduction system is operating and maintained to ensure	351 Bellevue is addressed by AOC (VW-91-C-081 dated December 31, 1990) with the property owners - prohibits residential and commercial construction on the parcel.  Environmental Covenant planned.  353 Bellevue is addressed by Environmental Covenant recorded with LaSalle County

				that levels of radon in such buildings do not exceed 0.02 working level. Only slab-type buildings allowed.	Recorder. Doc No. 2009-22484 on 9/2/2009 - prohibits excavation of soil below 491.25 feet and prohibits building construction unless radon reduction system is in place in certain areas.
NPL-11: Groundwater	Yes	Yes	21-01-114-007	Prohibit use of groundwater.	City of Ottawa Ordinance Number 002-2007 (January 16, 2007).
Illinois Power Building: Soil underneath building has not been tested and may be contaminated with radium-226.  Indoor Air	Yes	Yes	320 W. Jefferson St. parcel	No excavation under buildings or interference with foundation  Radon Mitigation System.	Declaration of Environmental Restrictive Covenant was recorded with the LaSalle County Recorder (document no. 2008-20282) on September 9, 2008.

A map showing the areas in which the ICs apply will be developed as part of the IC plan.

Status of Access Restrictions and ICs:

ICs are required at NPL-1, 8, 9, 11, and Illinois Power Building.

Residual contamination remains adjacent to NPL-4, in the ROW area of Canal Road, due to the presence of an 8-inch high-pressure gas main. This area may require ICs.

Site-wide: The City of Ottawa has agreed to establish a repository for environmental covenants and develop procedures for notifying applicants for building permits of any activity and use restrictions necessary for the Ottawa Radiation Areas Site in accordance with the Consent Decree (1:10-cv-01887) for the Ottawa Radiation Site.

NPL-1: In the northwest corner of NPL-1, the contamination extends under Guion Street. In a Consent Decree (1:10-cv-01887) with the United States, the City of Ottawa has agreed to prohibit interference with the asphalt road and excavation of soils under the road unless the action is taken pursuant to a work plan approved by EPA. There is currently compliance with the restrictions on Guion Street.

EPA signed a ROD Amendment on September 6, 2013 to modify the 2000 ROD remedy to include Area NPL-1E and to select in-place containment, and ICs on three parcels (River Walk Access Right of Way, 325 E. Lafayette St., parcel 21-11-237-001, and Guion St.) as the amended remedy to address remaining contaminated soil at depth in Areas NPL-1A and NPL-1E. Under the amended remedy, ICs, such as an environmental covenants under the Illinois UECA, would impose the following perpetual activity and use limitations on the NPL-1 site:

- Prohibit excavation of soil and/or material below approximately 4 feet bgs at Area NPL-1A, and 2 feet at Area NPL-1E, unless the excavation is conducted pursuant to an EPA-or IEMA-approved work plan.
- Prohibit construction and use of any building.
- Require that material excavated from any portion of the Site be tested and disposed of in accordance with applicable regulations.
- Maintain the clean soil cover in the area of ICs, which is present to at least 4 feet bgs at NPL-1A.
- Maintain a hard surface or clean soil cover of at least 6.5 inches in thickness at Area-1E.
- Prohibit any indoor and residential use.
- Prohibit uses inconsistent with recreational land use at Area NPL-1A.
- Prohibit uses inconsistent with current land use as a public roadway or recreational land use at Area NPL-1E.

NPL-9: The remedy implemented at NPL-9 addressing radium-contaminated soil achieved the cleanup goal which would allow for UU/UE. However, soil screening at the property at 613 West Marquette Street, which is located within the NPL-9 subarea, indicated that while this property was not contaminated with radium, soil contaminated with lead was found at this property and certain other properties located within NPL-9. In an Action Memorandum dated September 17, 2001, EPA selected a response action to remove lead-contaminated soils above lead cleanup levels to a depth not to exceed 4 feet at 613 West Marquette Street and other properties (OU3 Lead Contaminated Soil Removal). Some areas of the 613 West Marquette Street parcel exceed industrial/commercial cleanup standards below 4 feet. The landowners (at that time) recorded a restrictive covenant (document no. R2004-6385) that limits the use of the property to industrial/commercial use, prohibits residential use and prohibits disturbance of soil below 4 feet and "runs with the land." IEMA and EPA may enforce the restrictions as third party beneficiaries. The 2000 ROD and the 2001 Action Memorandum do not require ICs for 613 West Marquette Street. An ESD requiring ICs for this parcel is needed. A commercial building was constructed on the property. No soil disturbances were observed during the FYR inspection. There is currently compliance with the restrictions on the property. The City of Ottawa has been notified of the land use restrictions in the restrictive covenant.

Illinois Power Building: The 2000 ROD required land use restrictions on the Illinois Power Building but did not specify the type of IC to implement the land use restrictions. The 2012 ESD documented the final decision to include the 2008 Environmental Restrictive Covenant as part of the remedy for the Site.

The soil beneath the Illinois Power Building was never evaluated, and the 2000 ROD requires radon monitoring, and if radon levels exceed permissible levels, then a radon reduction system will be operated in the building. EPA entered into an AOC with Illinois Power d/b/a AmerenIP (the owner at that time) whereby AmerenIP agreed to operate and maintain a radon reduction system in the Illinois Power Building and to prohibit any action to drill or intrude into, or demolish the building foundation. Furthermore, pursuant to the AOC, AmerenIP recorded a Declaration of Environmental Restrictive Covenant with the LaSalle County Recorder on September 9, 2008. The restrictive covenant included the following restrictions:

No excavation under buildings: The extent of contamination, if any, associated with the soils underneath the foundations of the buildings has not been determined. No action shall be taken to drill or intrude into, or demolish the building foundations and no action shall be taken to excavate soils under the buildings unless the owner conducts an extent of contamination study and removes all soils that exceed 6.2 pCi/g radium-226 pursuant to an IEMA approved work plan on the property.

Radon Mitigation System: The owner must operate and maintain a radon mitigation system in any buildings on the property to ensure that levels of radon do not exceed 4 pCi/L or other radon level that EPA determines is necessary to protect human health or the environment. The owner must conduct radon testing at the building at least every two years by an IEMA licensed measurement professional to ensure that the mitigation system is working properly.

AmerenIP provided EPA with a Chicago Title Insurance Company title commitment dated June 26, 2008 demonstrating AmerenIP's ownership of the property and recordation of the Environmental Restrictive Covenant on September 5, 2008 as document no. 2008-20282. EPA and IEMA may enforce the restrictive covenant as third party beneficiaries. The City of Ottawa has been notified of the land use restrictions in the AOC and restrictive covenant.

NPL- 11: The 2010 ROD Amendment requires implementation of environmental covenants (under the Illinois UECA) that impose the following activity and use limitations at the Site:

- Prohibit excavation of soil at the Site below an elevation of 491.25 feet in the area demarcated as the extent of contamination, unless conducted pursuant to an EPA- or IEMA-approved work plan;
- Prohibit construction of any building in the area demarcated as the extent of contamination, unless a radon reduction system is operating and maintained to ensure that levels of radon in such buildings do not exceed 0.02 working level. Further, only slab-type buildings would be allowed;
- Require that material excavated from any portion of the Site be tested and disposed of in accordance with applicable regulations; and
- Prohibit use of groundwater at the NPL-11 Site.

The owner of 353 Bellevue Avenue recorded a restrictive covenant (document no. 2009-22484) with the LaSalle County Recorder on September 2, 2009 that implements the required land use restrictions on this parcel. The owners of 351 Bellevue Avenue entered into an AOC (VW-91-C-081 dated December

31, 1990) with EPA whereby the owners agreed to prohibit residential and commercial construction on the parcel. EPA will work with the owners of 351 Bellevue Avenue to implement an environmental covenant under the Illinois UECA to implement the land use restrictions required by the ROD Amendment. The City of Ottawa has been notified of the land use restrictions required at NPL-11.

EPA conducted an investigation of groundwater as required by the ROD Amendment. This investigation was completed May 12, 2014. The results show that groundwater does not exceed the standards (see Data Review). The City of Ottawa has an Ordinance Number 002-2007 (effective January 16, 2007), which prohibits the use of groundwater as a potable water supply by the installation or use of potable water supply wells within the City.

NPL-8 landfill: The 2000 ROD for the NPL-8 landfill requires land use restrictions that prohibit interference with the 10 foot cover (when completed), and all uses except recreational use and structures with slab on grade with appropriate controls for radon gas. The State of Illinois owns the property and in comments on the 2000 ROD stated that it intends to limit future use of the property to recreational use and will be responsible for enforcing the restrictions. The remedy has not yet been initiated for the NPL-8 landfill property. The property is currently fenced and unused. The City of Ottawa has been notified of the necessary land use restrictions on NPL-8.

NPL-8 Frontage Property: The 2003 ROD for the NPL-8 Frontage Property requires land use restrictions via a restrictive covenant to: a) restrict future use of the property to commercial/ industrial; b) prohibit disturbance of the 10-foot cover; c) require radon reduction system and monitoring on any buildings constructed on a portion of the property in the future; and d) limit construction to only slab on grade buildings. The remedy has not yet been initiated for the NPL-8 Frontage Property. The current owners and the City of Ottawa have been notified of these necessary land use restrictions.

#### Current Compliance:

Based on the Site inspection, no inappropriate land use was observed. EPA and IEMA are not aware of Site or media uses that are inconsistent with the stated objectives of the ICs. The current FYR confirmed that the objectives of the ICs are being complied with. No activities were observed that would have violated the ICs. No new uses of groundwater were observed. The remedy appears to be functioning as intended.

#### IC Follow-up Actions Needed:

In order to protect the integrity of the remedy long-term, the required environmental covenants at NPL-1 and NPL-11 must be implemented. EPA will also evaluate whether ICs are needed at NPL-4 in the ROW. EPA will work with the City of Ottawa and IEMA to develop an IC plan for the Site. A map showing the area in which the ICs apply will be developed as part of the IC plan. The IC plan will not be finalized until site-wide construction completion, thus a deadline for the IC plan is not included in this FYR.

#### Long-Term Stewardship:

Long-term protectiveness at the Site requires compliance with effective ICs to ensure that the remedy continues to function as intended. To assure proper maintenance, monitoring, and enforcement of effective ICs, long-term stewardship procedures will be reviewed and a long-term stewardship plan developed that will outline procedures for inspecting and monitoring compliance with the ICs and annual reporting requirements to demonstrate that the Site was inspected, that no inconsistent uses have

occurred, that ICs remain in place and are effective, and that any necessary contingency actions have been executed. Additionally, development of a communications plan and registering subareas where radium-contamination remains in place with the state's one call program will be explored for long-term stewardship.

EPA has entered into a Consent Decree with the City of Ottawa, whereby the City has agreed to prepare and implement a government plan that will include: a) establishment of a repository for property agreements and environmental covenants related to the Site; and b) procedures for notifying applicants of City building and construction permits of activity and use restrictions at the Site. EPA will request that the City submit a draft government plan to EPA for review and approval under the Consent Decree. These elements will be contained in the IC plan.

### **Systems Operations/Operation & Maintenance**

There is no Operation and Maintenance (O&M) planned for NPL-4, 9, or LPI Adjacent. O&M activities, such as compliance monitoring of land use restrictions, is required at NPL-1 Guion Street, NPL-11, and Illinois Power where subsurface radium contaminated material will remain in place. At NPL-8 (landfill and Frontage Property), following the completion of the remedial action, the post-closure monitoring and maintenance period would begin and an O&M Plan developed and implemented. The O&M activities would include annual groundwater monitoring and annual maintenance of the 10 foot backfill layer to preserve its integrity as a cover.

### III. PROGRESS SINCE THE LAST REVIEW

Table 1: Protectiveness Determinations/Statements from the 2011 FYR

OU1	Protectiveness Determination	Protectiveness Statement
NPL-8 Landfill		NPL-8 landfill: EPA selected the remedy for the NPL-8 landfill in a Record of Decision dated September 8, 2000 (2000 ROD), which includes excavation of soil down to a depth of 10 feet below ground surface (bgs), off-site disposal of soil, backfilling and ICs. ICs will be needed to prohibit disturbance of the 10 foot soil cover, prohibit construction of buildings with basements, and require a radon reduction system for any buildings without basements. The remedial actions have not yet begun at the NPL-8 landfill; therefore, this area cannot be evaluated for protectiveness as part of this FYR. A protectiveness determination is therefore not provided for OU1 in this FYR.

OU2	Protectiveness Determination	Protectiveness Statement
NPL-1, 4, 9, 11 and Illinois Power Building		<p>Overall, the protectiveness determination for OU2 cannot be made at this time because the remedies at NPL-1 and NPL-4 have not been completed. A protectiveness determination for OU2 will be made once the EPA completes the remedies at NPL-1 and NPL-4 subareas. In the interim, there are currently no known complete exposure pathways and therefore there are no unacceptable risks present at the OU2 subareas. Below is a discussion of each of the subareas of OU2:</p> <p>NPL-1: EPA selected a remedy for NPL-1 in the 2000 ROD, which requires excavation and disposal of all contaminated soil above the 6.2 pCi/g radium-226 cleanup standard. The remedy at NPL-1 is expected to be protective of human health and the environment upon completion of the excavation remedy and in the interim, exposure pathways that could result in unacceptable risks are being controlled. Radon sampling of the nearby Marquette High School locker room/storage facility has shown that levels of radon are below the action level of 4.0 pico curies/liter (pCi/l). Additional soil sampling of this area will be conducted.</p> <p>NPL-4: EPA selected a remedy for NPL-4 in the 2000 ROD, which requires excavation and disposal of all contaminated soil above the 6.2 pCi/g radium-226 cleanup standard. Remedial actions have not yet begun at NPL-4; therefore, this area cannot be evaluated for protectiveness as part of this FYR.</p>

		<p>NPL-9: EPA selected a remedy for NPL-9 in the 2000 ROD, which requires excavation and disposal of all contaminated soil above the 6.2 pCi/g radium-226 cleanup standard. The remedy at NPL-9 has been implemented and is protective of human health and the environment.</p> <p>NPL-11: For subarea NPL-11, the remedy is set forth in a 2003 ROD as amended by a ROD Amendment dated August 16, 2010. At NPL-11, the EPA has removed contaminated soil down to an elevation of 491.25 feet. The ROD Amendment addresses contaminated soil below an elevation of 491.25 feet by requiring the implementation of environmental covenants that prohibit: a) excavation below an elevation of 491.25 feet; b) buildings without radon reduction systems; and c) groundwater use. The remedy at NPL-11 is currently protective of human health and the environment because the existing use (empty field) is consistent with the land use restrictions. Long-term protectiveness requires the implementation of an environmental covenant and compliance with land use restrictions at NPL-11.</p> <p>Illinois Power Building: EPA selected the remedy for the Illinois Power Building subarea in the 2000 ROD, which includes soil excavation and off-site disposal of soil contaminated with radium-226 above 6.2 pCi/g; backfill of excavated areas with clean material; and, if radon levels persist in the Illinois Power Building, an operation of radon reduction system. The EPA has implemented the remedy at the Illinois Power subarea, and the remedy is protective of human health and the environment because radium contaminated soil has been excavated to meet the 6.2 pCi/g cleanup level and ICs have been implemented. However, the EPA must verify that the radon reduction system is operational, and that radon testing has been conducted by the property owner.</p>
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OU3	Protectiveness Determination	Protectiveness Statement
Lead-Contaminated Soil Removal Action	Short-term Protective	In an Action Memorandum dated September 17, 2001, EPA selected a response action to remove contaminated soils above lead cleanup levels to a depth not to exceed 4 feet at 613 West Marquette Street and certain other properties. Although the property at 613 West Marquette Street is located within the NPL-9 subarea, soil screening indicated that this address was not contaminated with radium; however, soil contaminated with lead was found at this property and certain other properties located within NPL-9. After implementation of the removal action, sampling revealed some areas at 613 West Marquette Street exceed industrial/commercial cleanup standards below 4 feet. The former landowners recorded a restrictive covenant that limits the use of the property to industrial/commercial use,



		prohibits residential use and prohibits disturbance of soil below 4 feet. The remedy at this property is currently protective of human health and the environment because the existing use is consistent with the land use restrictions. Long-term protectiveness requires compliance with institutional controls on the property.
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<b>OU4</b>	<b>Protectiveness Determination</b>	<b>Protectiveness Statement</b>
NPL-8 Frontage Property		EPA selected a remedy for the NPL-8 Frontage Property in the 2003 ROD, which requires excavation of soil down to a depth of 10 feet bgs, off-site disposal of soil, backfilling, and ICs. The 2003 ROD requires restrictive covenants to prohibit disturbance of the 10 foot soil cover, prohibit construction of buildings with basements, and require a radon reduction system for any buildings (without basements). The remedial action has not yet begun at NPL-8 Frontage Property; therefore, this area cannot be evaluated for protectiveness as part of this FYR. A protectiveness determination is, therefore, not provided for OU4 in this FYR.

<b>OU5</b>	<b>Protectiveness Determination</b>	<b>Protectiveness Statement</b>
LPI Adjacent	Protective	EPA selected a remedy for the LPI Adjacent property in an ESD dated March 21, 2007, which modified the 2003 ROD. The ESD required excavation and off-site disposal of soil contaminated with radium-226 above 6.2 pCi/g at the LPI Adjacent property. EPA has implemented the remedy at LPI Adjacent, which is protective of human health and the environment because radium-contaminated soil has been excavated to meet the 6.2 pCi/g cleanup level.

Table 2: Status of Recommendations from the 2011 FYR

<b>Issue</b>	<b>Recommendations and Follow-up Actions</b>	<b>Party Responsible</b>	<b>Oversight Agency</b>	<b>Milestone Date</b>	<b>Current Status</b>	<b>Completion Date (if Applicable)</b>
1: NPL-1: soil contamination may extend under the Marquette High School locker room/storage building.	NPL-1: investigate soil contamination underneath Marquette High School locker room/storage facility and address if necessary.	EPA	EPA	November 2012	Completed	9/6/2013
2: NPL-11: an environmental covenant is not in place on one of the parcels, as required by the ROD Amendment.	NPL-11: implement environmental covenant on remaining parcel.	EPA	EPA	April 2013	Not Complete	Not Complete
3: Illinois Power Building: the radon reduction system may not be operational and radon testing of the building may not have been conducted as required by the restrictive covenant.	Illinois Power Building: verify that the radon reduction system is operational and verify that radon testing has been conducted.	EPA	EPA	December 2012	Completed	7/22/2016

<b>Issue</b>	<b>Recommendations and Follow-up Actions</b>	<b>Party Responsible</b>	<b>Oversight Agency</b>	<b>Milestone Date</b>	<b>Current Status</b>	<b>Completion Date (if Applicable)</b>
4: Overall protectiveness may be improved by registration of areas where radium-226 contaminated soil will remain in place with the state one call program.	Improve long-term stewardship by exploring registering areas where radium-226 contaminated soil will remain in place with state one call program.	EPA	EPA	April 2013	Not Complete	Not Complete

An additional issue and recommended action were identified in the 2011 FYR: "The 2000 ROD required land use restrictions on the Illinois Power Building; however the ROD did not specify the type of ICs to implement the land use restrictions. An ESD will be developed to identify the implemented restrictive covenant." On August 2, 2012, EPA signed an ESD for the Illinois Power Building. The ROD addressed by this ESD is the OU2 2000 ROD.

**Issue 1:**

Issue 1 was addressed in 2013. EPA signed a ROD Amendment on September 6, 2013 to modify the 2000 ROD remedy to include Area NPL-1E and to select in-place containment, and ICs as the amended remedy to address remaining contaminated soil at depth of 6 to 16 feet in Areas NPL-1A and NPL-1E.

**Issue 2:**

The implementation of an environmental covenant on a remaining parcel at NPL-11 was not completed and will be addressed in the 2016 FYR.

**Issue 3:**

EPA observed that the old radon reduction system at the Illinois Power Building was dismantled. Based on initial diagnostic testing, it was determined that it was necessary to install four separate radon reduction systems at the Illinois Power Building in order to reduce the radon levels below 4 pCi/g. In January 2015, radon reduction systems installation were completed. The 90-days radon results for the March through May 2016 monitoring period indicated that the radon reduction systems are reducing radon concentrations below the EPA action level. Issue 3 was resolved on July 22, 2016.

Issue 4:

Issue 4, improve long-term stewardship by exploring registering areas where radium-226 contaminated soil will remain in place with state one call program, was not completed and will be addressed in the 2016 FYR.

#### **IV. FIVE-YEAR REVIEW PROCESS**

##### **Community Notification, Involvement & Site Interviews**

A notice was published in the local newspaper, The Times, on August 31, 2016, stating that a FYR was being conducted and that the FYR report will be made available on EPA's website for the Site. A copy of the public notice can be found in Appendix C.

##### **Data Review**

EPA conducted a groundwater investigation at NPL-11 as required by the 2010 ROD Amendment. This groundwater investigation was completed in May 2014. The investigation included collection of sediment samples from Goose Creek; installation of bedrock and shallow monitoring wells; single well permeability testing and a well elevation survey; collection of quarterly groundwater samples; and collection of quarterly radon samples from nearby residential property to determine whether elevated concentrations of radium-226 in groundwater are migrating off-site and impacting Gosse Creek or nearby resident populations. The conclusion of the NPL-11 investigation area is summarized as follows:

- Sediment sample analytical results do not exceed the health-based surface soil standard of 6.2 pCi/g for radium-226.
- Groundwater analytical results from four sampling events did not exceed the total radium standard of 5 pCi/L.
- Residential radon sampling results do not indicate that the presence of radon above the non-regulatory value for radon-222 gas of 4 pCi/L; thus residents are not impacted by vapor intrusion.
- Investigation derived waste sample analytical results did not indicate that soil collected from drill cutting at the Site is hazardous.

The 90-day radon results for the Illinois Power Building for the March through May 2016 monitoring period indicated that the radon reduction systems are reducing radon concentrations below the EPA action level.

##### **Site Inspection**

An inspection of the Site was conducted on September 27, 2016, by Nabil Fayoumi, EPA RPM. Also present were Robin Ambrose, IL EPA and Adnan Khayyat and Kelly Horn, IEMA. The purpose of the inspection was to assess the protectiveness of the remedies at NPL- 1, 4, 9, 11, Illinois Power Building, and LPI Adjacent subareas where the soil excavation activities have been completed.

There have been no physical condition or land use changes at the NPL-1, 4, 9, 11, Illinois Power Building, and LPI Adjacent subareas. At the NPL-9 lead-contaminated soil removal property, no soil disturbances were observed.

During the inspection of the Site, there were no disturbances to the Illinois Power Building foundation noted. The radon mitigation system was operational. Additionally, EPA verified that the property owner has conducted the required radon testing of the building.

During the inspection of NPL-1 and NPL-11, the soil was not disturbed. The properties remain vacant at NPL-1 and NPL-11.

## **V. TECHNICAL ASSESSMENT**

**QUESTION A:** Is the remedy functioning as intended by the decision documents?

Answer: Yes.

For those operable units where the remedy has been implemented, the remedy is functioning as intended. The remedies at six subareas have been completely implemented and they are functioning as intended. They include the excavation and disposal of radium-contaminated soil at the NPL-1, NPL-4, NPL-9, NPL-11, Illinois Power Building, and LPI Adjacent subareas.

NPL-1A and NPL-11 remain vacant and no disturbance of soil was observed. Environmental covenants implement land use restrictions on one parcel at NPL-1 and NPL-11, and an AOC implements land use restrictions on the other parcel at NPL-11. EPA will continue to work with the current owners and the City of Ottawa to ensure that the required environmental covenants are implemented on all parcels at NPL-1 (River Walk Access Right of Way, and Guion St) and NPL-11 (351 Bellevue Ave). EPA conducted an investigation of groundwater to determine the extent of contamination at NPL-11. The investigation was completed on May 12, 2014. Based on this investigation, no further action was needed at NPL-11. There is no other information that calls into question the protectiveness of remedies at these six subareas.

The Illinois Power Building is subject to a restrictive covenant requiring use of a radon mitigation system. EPA confirmed the use and effectiveness of the system.

Via a September 17, 2001 Action Memorandum, EPA implemented a removal action to remove lead-contaminated soils above lead cleanup levels to a depth not to exceed 4 feet at 613 West Marquette Street and other properties. Some areas of the 613 West Marquette Street parcel exceed industrial/commercial cleanup standards below 4 feet. A restrictive covenant was recorded implementing land use restrictions. The 2000 ROD and the 2001 Action Memorandum do not require ICs for 613 West Marquette Street. An ESD requiring ICs for this parcel is needed.

Residual contamination remains adjacent to NPL-4, in the ROW area of Canal Road, due to the presence of an 8-inch high pressure gas main. EPA will gather additional information to characterize this area and develop a remedial approach including a determination on whether ICs are needed.

To assure proper maintenance, monitoring, and enforcement of effective ICs, a long-term stewardship plan will be developed that will outline procedures for inspecting and monitoring compliance with the ICs and annual reporting requirements to demonstrate that the Site was inspected, that no inconsistent uses have occurred, that ICs remain in place and are effective, and that any necessary contingency actions have been executed. Additionally, development of a communications plan and registering

subareas where radium-contamination remains in place with the state's one call program will be explored for long-term stewardship.

Current Use Compatibility with Land Use Restriction: The ICs at NPL-1 (325 E. Lafayette St), NPL-9, NPL-11 (353 Bellevue Avenue parcel), and Illinois Power Building are in place and are proving to be effective in preventing exposure. Based on the Site inspection, EPA is not aware of any Site uses which are inconsistent with the stated objectives of the ICs. The remedy appears to be functioning as intended.

**QUESTION B:** Are the exposure assumptions, toxicity data, cleanup levels, and RAOs used at the time of the remedy selection still valid?

Answer: Yes.

The RAOs in place at the time of the remedy selection are still valid. Other factors are discussed below.

Changes in Standards and To-Be-Considered Requirements: Standards outlined and updated in the decision documents and discussed in the previous FYR reports are still valid at the Site. There have been no known changes in Applicable or Relevant and Appropriate Requirements or standards affecting the protectiveness of the remedy since the last FYR report.

Changes in Exposure Pathways: There have been no changes in the potential exposure pathways at the Site since the 2011 FYR. No other changes in the Site conditions that affect exposure pathways were identified as part of this FYR. There are no current or known planned changes in the Site land use.

Changes in Toxicity and Other Contaminant Characteristics: Neither the toxicity factors for the contaminants of concern nor other contaminant characteristics have changed in a way that could affect the protectiveness of the remedy. Because the remedy implemented ICs to prevent contact with contaminants that remain at the Site, changes in COC toxicity would not impact the effectiveness of the remedy.

Changes in Risk Assessment Methods: Standardized risk assessment methods have not changed in a way that could affect the assessment of the protectiveness of the remedy.

**QUESTION C:** Has any other information come to light that could call into question the protectiveness of the remedy?

Answer: No.

According to the data reviewed and the Site inspection, there is no new information that would suggest that the selected remedy is not protective.

## VI. ISSUES/RECOMMENDATIONS

### Issues and Recommendations Identified in the Five-Year Review:

OU(s): 2	<b>Issue Category: Institutional Controls</b>			
	<b>Issue:</b> An environmental covenant is not in place on one of the parcels at NPL-11, as required by the ROD Amendment.			
	<b>Recommendation:</b> Implement environmental covenant on remaining parcel at NPL-11 (351 Bellevue Avenue parcel).			
<b>Affect Current Protectiveness</b>	<b>Affect Future Protectiveness</b>	<b>Party Responsible</b>	<b>Oversight Party</b>	<b>Milestone Date</b>
No	Yes	EPA	EPA	12/30/2018

OU(s): 2	<b>Issue Category: Institutional Controls</b>			
	<b>Issue:</b> Overall protectiveness may be improved by registration of areas where radium-226 contaminated soil will remain in place with the state one call program.			
	<b>Recommendation:</b> Improve long-term stewardship by exploring registering areas where radium-226 contaminated soil will remain in place with state one call program.			
<b>Affect Current Protectiveness</b>	<b>Affect Future Protectiveness</b>	<b>Party Responsible</b>	<b>Oversight Party</b>	<b>Milestone Date</b>
No	Yes	EPA	EPA	12/30/2018

OU(s): 2	<b>Issue Category: Institutional Controls</b>			
	<b>Issue:</b> Two environmental covenants are not in place on two of the parcels at NPL-1 (River Walk Access Right of Way and Guion St), as required by the 2013 ROD Amendment.			
	<b>Recommendation:</b> Implement environmental covenants on the remaining two parcels at NPL-1 (River Walk Access Right of Way and Guion St.).			
<b>Affect Current Protectiveness</b>	<b>Affect Future Protectiveness</b>	<b>Party Responsible</b>	<b>Oversight Party</b>	<b>Milestone Date</b>
No	Yes	EPA	EPA	12/30/2018

<b>OU(s):</b> 2	<b>Issue Category: Institutional Controls</b>			
	<b>Issue:</b> The need for ICs at NPL-4, in the right-of-way (ROW) area of Canal Road, should be evaluated.			
	<b>Recommendation:</b> Evaluate the need for ICs at NPL-4 in the right-of-way (ROW) area of Canal Road.			
<b>Affect Current Protectiveness</b>	<b>Affect Future Protectiveness</b>	<b>Party Responsible</b>	<b>Oversight Party</b>	<b>Milestone Date</b>
No	Yes	EPA	EPA	12/30/2018

<b>OU(s):</b> 2, 3	<b>Issue Category: Institutional Controls</b>			
	<b>Issue:</b> Documents and procedures should be developed and implemented to ensure that implemented ICs are effective and properly maintained, monitored, and enforced.			
	<b>Recommendation:</b> Develop and implement a Long-Term Stewardship Plan that outlines procedures for inspecting and monitoring compliance with the ICs and annual reporting requirements to demonstrate that the Site was inspected, that no inconsistent uses have occurred, that ICs remain in place and are effective, and that any necessary contingency actions have been executed. Additionally, development of a communications plan and registering subareas where radium-contamination remains in place with the state's one call program will be explored for long-term stewardship.			
<b>Affect Current Protectiveness</b>	<b>Affect Future Protectiveness</b>	<b>Party Responsible</b>	<b>Oversight Party</b>	<b>Milestone Date</b>
No	Yes	EPA	EPA	12/30/2019

<b>OU(s):</b> 3	<b>Issue Category: Institutional Controls</b>			
	<b>Issue:</b> The 2000 ROD and the 2001 Action Memorandum do not require ICs for 613 West Marquette Street at NPL-9. An ESD requiring ICs for this parcel is needed.			
	<b>Recommendation:</b> Issue an ESD to include ICs at 613 West Marquette Street as part of NPL-9 selected remedy.			
<b>Affect Current Protectiveness</b>	<b>Affect Future Protectiveness</b>	<b>Party Responsible</b>	<b>Oversight Party</b>	<b>Milestone Date</b>
No	Yes	EPA	EPA	12/30/2018



## OTHER FINDINGS

- IEMA requested clearing and grubbing of trees and shrubs along the fence at NPL-8. IEMA does not currently have the resources or capacity to clear the NPL-8 fence-line. Overgrowth of vegetation threatens structural integrity of the fence, and consequently, this could lead to trespassing.
- There is known radium-226 contamination along the east-side of Guion Street (NPL-1 Area E) extending beneath the sewer line. In light of sewer repair concerns raised by the City of Ottawa, IEMA is requesting that the EPA re-consider excavation and disposal of this material. In 2013, as requested by IEMA, a ROD Amendment was issued for NPL-1 in which it was determined that additional excavation at NPL-1 will be difficult to implement, the remedial action cost would be unreasonably high relative to the long-term benefits, and the residual radium contaminated waste does not pose a clear present or future hazard to human health and the environment. IEMA's new request includes excavation of this contaminated soil, removes the requirement for ICs, and includes contamination beneath Lafayette Street. EPA will evaluate IEMA's request.
- IEMA requested that the Site, excluding NPL-8, be considered for delisting from the NPL. Once all required ICs are in place and effective, EPA will pursue partial delisting of the Site.
- The NPL-8 frontage property is occupied by Grand Rapids Enterprises, which is using the property for construction storage. An area at the property has been recently fenced. EPA will reach out to the current occupant regarding its activities and any site restrictions.
- Residual contamination remains adjacent to NPL-4, in the ROW area of Canal Road, due to the presence of an 8-inch high pressure gas main. EPA will gather additional information to characterize this area and develop a remedial approach including a determination on whether ICs are needed.

## VII. PROTECTIVENESS STATEMENT

Construction of the remedies for the Ottawa Radiation Areas Site have only been completed at OUs 2, 3, and 5. The Site has not yet reached construction completion. The status and protectiveness determinations are summarized for each OU of the Site below:

OU2 (NPL-1, 4, 9, 11 and Illinois Power Building):

OU 2 Protectiveness Statement
<i>Protectiveness Determination:</i> Short-term Protective
<i>Protectiveness Statement:</i> The remedy at OU2 (NPL-1, 4, 9, 11 and Illinois Power Building) currently protects human health and the environment because risks have been addressed through excavation and

disposal of Radium-226 contaminated soil and implementation of ICs. However, in order for the remedy to be protective in the long-term, the following actions need to be taken: implementation of environmental covenants and compliance with land use restrictions at NPL-1 and NPL-11; operation of the radon reduction systems and radon testing at the Illinois Power Building; and development and implementation of a Long-Term Stewardship Plan to ensure protectiveness.

OU3 (Lead-Contaminated Soil Removal Action):

**OU 3 Protectiveness Statement**

*Protectiveness Determination:*

Short-term Protective

*Protectiveness Statement:*

The remedy at OU 3 (Lead-Contaminated Soil Removal) currently protects human health and the environment because risks have been addressed through the removal of lead contaminated soils above lead cleanup levels at 613 West Marquette Street and certain other properties. Although the property at 613 West Marquette Street is located within the NPL-9 subarea, soil screening indicated that this address was not contaminated with radium-226; however, soil contaminated with lead was found at this property and certain other properties located within NPL-9. After implementation of the removal action, sampling revealed some areas at 613 West Marquette Street exceeded industrial/commercial cleanup standards below 4 feet bgs. The former landowners recorded a restrictive covenant that limits the use of the property to industrial/commercial use, prohibits residential use and prohibits disturbance of soil below 4 feet bgs. However, in order for the remedy to be protective in the long-term, the following actions need to be taken: issue an ESD to include ICs at 613 West Marquette Street as part of NPL-9 selected remedy, and development and implementation of a Long-Term Stewardship Plan to ensure protectiveness. Long-term protectiveness requires compliance with ICs on the property.

OU5 (LPI Adjacent):

**OU 5 Protectiveness Statement**

*Protectiveness Determination:*

Protective

*Protectiveness Statement:*

The remedy at OU5 (LPI Adjacent) is protective of human health and the environment. EPA selected a remedy for the LPI Adjacent property in an ESD dated March 21, 2007, which modified the 2003 ROD. The ESD required excavation and off-site disposal of soil contaminated with radium-226 above 6.2 pCi/g at the LPI Adjacent property. EPA has

implemented the remedy at LPI Adjacent, which is protective of human health and the environment because radium-contaminated soil has been excavated to meet the 6.2 pCi/g cleanup level.

#### **VIII. NEXT REVIEW**

The next FYR report for the Ottawa Radiation Areas Superfund Site is required no less than five years from EPA's signature date of this review.

## **APPENDIX A – REFERENCE LIST**

- 2012 Explanation of Significant Differences (ESD), dated August 2, 2012
- 2013 ROD Amendment, dated September 6, 2013
- Weston Technical Memorandum, Ottawa Radiation Area NPL-11, dated May 12, 2014
- 2016 NPL-4 Phase I Remedial Action Report, dated September 20, 2016

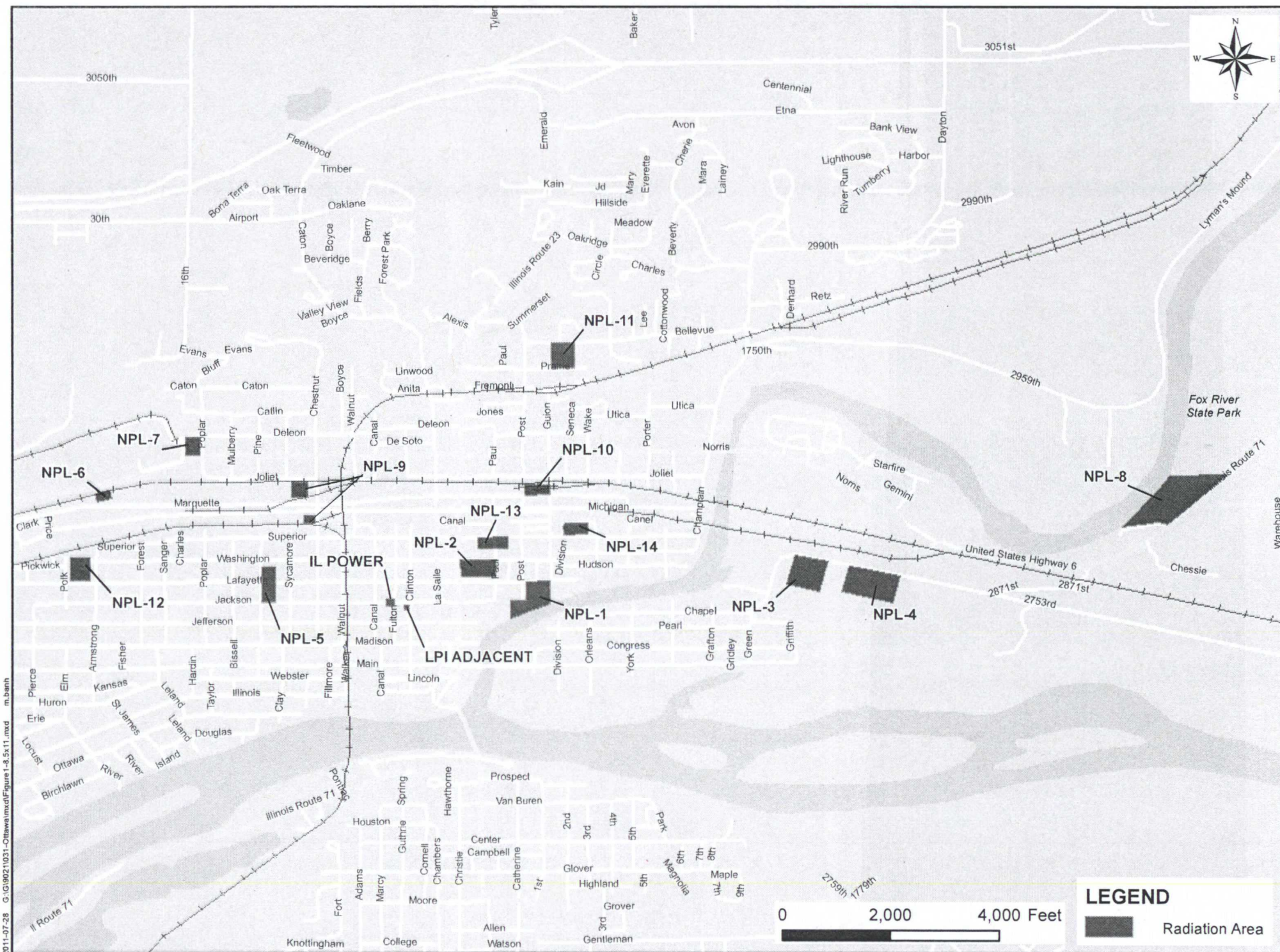
## **OTHER APPENDICES**

Appendix B – Site Map

Appendix C – Public Notice



## OTTAWA RADIATION AREAS LOCATION MAP





## **EPA Begins Review of Ottawa Radiation Areas Superfund Site Ottawa, Illinois**

U.S. Environmental Protection Agency is conducting a five-year review of the Ottawa Radiation Area Superfund site in Ottawa, Ill. The Superfund law requires regular checkups of sites that have been cleaned up – with waste managed on-site – to make sure the cleanup continues to protect people and the environment. This is the second five year review for the site.

The Ottawa Radiation Area consists of 16 radium-contaminated subareas. EPA removed contaminated soil in many of these subareas. Seven subareas (NPL-1, 4, 8, 9, 11, Illinois Power and Luminous Processes Inc. Adjacent) were investigated under the remedial program.

EPA completed cleanup actions at NPL-1, NPL-4, NPL-9, NPL-11, the Illinois Power Building and the LPI Adjacent. Cleanup actions included excavating soil contaminated with excessive levels of radium-226, backfilling excavated areas with clean material, disposing of the excavated contaminated material at a licensed radioactive material or off-site landfill, collecting shallow underground water supplies and treating and discharging it to surface water or the city of Ottawa's wastewater treatment system, and establishing institutional controls on the various parcels.

In 2011, EPA completed the first five-year review and determined the remedies at NPL-9, NPL-11, Illinois Power, and LPI Adjacent subareas are protective of human health and the environment. The cleanup remedies for NPL-1 and NPL-4 have been completed since the last review. The cleanup remedy at NPL-8 has not been implemented yet.

More information is available at the Reddick Library, 1010 Canal St., Ottawa, and at [www.epa.gov/superfund/ottawa](http://www.epa.gov/superfund/ottawa).

The five-year review is an opportunity for you to tell EPA about site conditions and any concerns you have. Contact:

**Cheryl Allen**  
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312-353-6196  
[allen.cheryl@epa.gov](mailto:allen.cheryl@epa.gov)

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You may call EPA toll-free at 800-621-8431, 8:30 a.m. to 4:30 p.m., weekdays.



**THE DAVID GROUP**

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